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SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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07/872,599 04/23/92 RUMBAUGH

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EXAMINER

PARKER, K

ART UNIT

PAPER NUMBER

WILLIAM A. BIRDWELL AND ASSOCIATES
101 S.W. MAIN STREET
SUITE 600
PORTLAND, OR 97204

2504

DATE MAILED:

11/02/92

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☐ Responsive to communication filed on _____ ☐ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☒ Notice of References Cited by Examiner, PTO-892.
2. ☒ Notice re Patent Drawing, PTO-948.
3. ☒ Notice of Art Cited by Applicant, PTO-1449.
4. ☐ Notice of Informal Patent Application, Form PTO-152.
5. ☒ Information on How to Effect Drawing Changes, PTO-1474.
6. ☐

Part II SUMMARY OF ACTION

1. ☒ Claims 1-21 are pending in the application.

Of the above, claims _____ are withdrawn from consideration.

2. ☐ Claims _____ have been cancelled.

3. ☐ Claims _____ are allowed.

4. ☒ Claims WAD 1-15, 18-21 are rejected.

5. ☒ Claims 16-17 are objected to.

6. ☐ Claims _____ are subject to restriction or election requirement.

7. ☐ This application has been filed with Informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8. ☐ Formal drawings are required in response to this Office action.

9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable. ☐ not acceptable (see explanation or Notice re Patent Drawing, PTO-948).

10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____ has (have) been ☐ approved by the examiner. ☐ disapproved by the examiner (see explanation).

11. ☐ The proposed drawing correction, filed on _____, has been ☐ approved. ☐ disapproved (see explanation).

12. ☐ Acknowledgment is made of the claim for priority under U.S.C. 119. The certified copy has ☐ been received ☐ not been received
☐ been filed in parent application, serial no. _____; filed on _____

13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11,453 O.G. 213.

14. ☐ Other

EXAMINER'S ACTION

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Claims 8, 14, 15 and 19 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The specification does not disclose any information regarding "difference means"; therefore, "difference means" lacks proper antecedent basis. Additionally, "difference means" could be means to cause difference, perform the numerical subtraction, or cause the numerical subtraction; and is therefore ambiguous.

The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 1-7 and 20 are rejected under 35 U.S.C. § 103 as being unpatentable over Bos (4,635,051) in view of Tsukamoto et al. and Kaneko.

Bos discloses a pair of retarders mounted in series so as to

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have perpendicularly aligned fast axis. Drive means and control means or disclosed (column 8, lines 7 - line 31). Lacking from the disclosure for claims 1-6 is a drive means which exceeds the transition sustaining voltage. It was known at the time that rise time is inversely proportional to the torque on the liquid crystal molecules, which is in turn proportional to the square root of the driving voltage. It was also known to use a voltage which is higher than the transition voltage of the liquid crystal in order to shorten the rise time. Kaneko evidences this, teaching an equation for the rise time which assumes the driving voltage to be much larger than the transition voltage, and that it is inversely proportional to the square of the driving voltage (pg. 22, 1st paragraph). Tsukamoto et al. also evidence this, using an initial driving voltage higher than the device threshold voltage (figure 4a). Therefore, it would have been obvious, in the device of Bos, to use an initial driving voltage higher than the threshold voltage, as was well known for increasing rise time as is evidenced by Tsukamoto et al. and Kaneko.

Claims 9-11 are rejected under 35 U.S.C. § 103 as being unpatentable over Bos (4,635,051) in view of Tsukamoto et al. and Kaneko as applied to claims 1-7 above, and further in view of Kalmanash et al.

Claim 9 adds the limitation of a means for adjusting the amplitude of the signals to both retarders to adjust both

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retardances the same amount. Kalmanash et al. disclose a system whereby a single voltage source is connected to one plate of both retarders (figure 2a, item 26). Kalmanash et al. describe the system as a push-pull system, and teach that their system enables better temperature independence (column 4, lines 3-64).

Therefore, it would have been obvious in the device of Bos as modified by Tsukamoto et al and Kaneko, to use the push-pull method of Kalmanash for better temperature independence.

Claims 12-13 are rejected under 35 U.S.C. § 103 as being unpatentable over Bos (4,635,051) in view of Tsukamoto et al. and Kaneko as applied to claim 1 above, and further in view of Rumbaugh et al.

Claims 12-13 add the limitations of coupling to fiber optic, and coupling to fiber optics using a GRIN rod. Rumbaugh et al. teach the use of nematic liquid crystal retarders for use in polarization control in fiber-optic systems. Therefore it would have been obvious to use fiber optics to use the liquid crystal retarder of Bos as modified by Tsukamoto et al. and Kaneko in a fiber optic system, as is taught by Rumbaugh et al.

Claims 16-17 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112 and to include all of the limitations of the base claim and any intervening claims.

Claim 18 is rejected under 35 U.S.C. § 103 as being unpatentable over Noe et al. in view of Tsukamoto et al. and

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Kaneko.

Noe et al. disclose several polarization control systems, including a liquid crystal retarder based variety (pg. 1356, column 2, paragraph 3). Noe et al. lacks disclosure of the driving means including driving means which go beyond the amplitude required for a short period of time. As discussed earlier in this action, it was known to use a voltage which is higher than the transition voltage of a liquid crystal device to shorten the rise time, and was evidenced by Kaneko and Tsukamoto et al. Therefore, it would have been obvious to use a driving voltage beyond the required amplitude in order to accelerate the rise time as was evidenced by Kaneko and Tsukamoto et al.

Claim 21 is rejected under 35 U.S.C. § 103 as being unpatentable over Ferguson.

Ferguson discloses a light modulator which operates in a push-pull manner and uses a retarder based on a pair of liquid crystal cells. Operation in a push-pull manner indicates that the difference is what creates the retardance level, however, the difference is not pre-calculated but is the difference between the two signals being modulated. Because this device is functioning for a purpose which the difference is actually being determined by the device, it is not necessary to calculate the difference. Further, not having calculated the difference does not affect functionally. Therefore, it would have been obvious

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to calculate the difference, because the effect would be the same.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Akiyama et al. - discloses a liquid crystal panel using two cells.

Moriyama et al. - discloses a liquid crystal display using two cells.

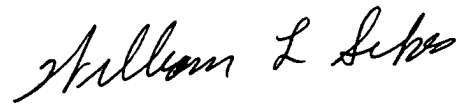
Banbury et al. - discloses a liquid crystal display using two cells.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Parker whose telephone number is (703) 308-3029.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Parker/ks
October 23, 1992



WILLIAM L. SIKES
SUPERVISORY PATENT EXAMINER
GROUP 2500